Name:

at1118paper: Complete the Square (v419)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 54x = -608$$

Add $\left(\frac{-54}{2}\right)^2$, which equals 729, to both sides of the equation.

$$x^2 - 54x + 729 = 121$$

Factor the left side.

$$(x - 27)^2 = 121$$

Undo the squaring. We need to consider both $\pm\sqrt{121}$.

$$x - 27 = -11 \quad \text{or} \quad x - 27 = 11$$
$$x = -38 \quad \text{or} \quad x = -16$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 - 42x = -392$$

$$x^2 - 42x + 441 = 49$$
$$(x - 21)^2 = 49$$
$$x - 21 = \pm 7$$
$$x = 14 \quad \text{or} \quad x = 28$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 - 8x = 308$$

$$x^2 - 8x + 16 = 324$$
$$(x - 4)^2 = 324$$
$$x - 4 = \pm 18$$
$$x = -14 \quad \text{or} \quad x = 22$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 + 54x = -725$$

$$x^2 + 54x + 729 = 4$$
$$(x + 27)^2 = 4$$
$$x + 27 = \pm 2$$
$$x = -29 \quad \text{or} \quad x = -25$$

Question 4

By completing the square, find both solutions to the given equation:

$$x^2 + 10x = 0$$

$$x^2 + 10x + 25 = 25$$
$$(x + 5)^2 = 25$$
$$x + 5 = \pm 5$$
$$x = -10 \quad \text{or} \quad x = 0$$

Question 5

By completing the square, find both solutions to the given equation:

$$x^2 + 52x = -651$$

$$x^2 + 52x + 676 = 25$$
$$(x + 26)^2 = 25$$
$$x + 26 = \pm 5$$
$$x = -31 \quad \text{or} \quad x = -21$$

Question 6

By completing the square, find both solutions to the given equation:

$$x^2 + 38x = 264$$

$$x^2 + 38x + 361 = 625$$
$$(x + 19)^2 = 625$$
$$x + 19 = \pm 25$$
$$x = -44 \quad \text{or} \quad x = 6$$